

Sea Floor Samples Laboratory

James E. Broda
Woods Hole Oceanographic Institution
Woods Hole MA. 02543
Phone: 508-289-2466 Fax: 508-457-2183 jbroda@whoi.edu

William B. Curry
Woods Hole Oceanographic Institution
Woods Hole MA. 02543
Phone: 508-289-2591 Fax: 508-457-2187 wcurry@whoi.edu

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LONG TERM GOALS

The main purpose of this project is to provide consistent curatorial support for the Woods Hole Oceanographic Institution's ongoing geological sampling programs. The project serves two principal purposes: first to facilitate the initial curation of incoming sea floor samples, and second to assist the many investigators from WHOI and elsewhere for whom collected samples may provide an important source of research materials. Core lab operations include the implementation of procedures for the description and curation of seafloor samples of all types and the distribution of these materials to members of the global oceanographic community.

In addition, our staff prepares and deploys sea floor sampling tools used on field programs at WHOI and other institutions in the UNOLS consortium. Along with onshore sample curation activities, we're responsible for specifying and planning all aspects of marine geological sample acquisition programs including conception and design of equipment. We provide a complete resource that includes not only modern sample archiving, but also sea-going expertise, and a large and growing inventory of highly tuned sampling equipment.

OBJECTIVES

The Sea Floor Samples Laboratory of the Woods Hole Oceanographic Institution has been a resource for the fundamental material required to undertake paleoceanographic, geochemical and marine petrological research for more than three decades. While the curated samples in the collection represent the principal component of this formula, a wide array of specialized equipment developed and deployed by the staff of the lab has traditionally allowed the sample acquisition requirements of many investigators throughout the community to be met. In addition to providing access to these basic "tools", the laboratory serves as an arena for the interaction of national and international users of the facility and scientists from the Woods Hole Oceanographic Institution.

APPROACH

Routine processes undertaken in the lab insure immediate access to newly acquired materials collected on recent expeditions. These procedures include logging, archiving, and digitization of station data; plus the initial description of cores, dredges and other sample collections. Previously acquired samples curated at the facility provide opportunities for a wide variety of research projects including preliminary studies, investigations where archived material plays a supplemental role to ongoing research, and stand alone ventures that depend wholly on those materials at hand. Thus, processing of incoming suites of samples and distribution of historically acquired material, continue with equal priority and are the foundation of the laboratory's activities. Ellen Roosen, a research associate, is principally responsible for these operations.

WORK COMPLETED

Throughout the most recent grant period we have sustained the programs that have customarily been the backbone of the Sea Floor Sample Laboratory's operations. Hundreds of sample requests have been processed and the consistent demand for archived material that this activity represents demonstrates the continuing value that previously acquired materials represent to the community. We have addressed the needs of our international audience of marine geological and geochemical scientists by providing access to the well-documented samples we archive and the data that relate to them. During the past three years, our sample and data distribution efforts have benefited more than 95 researchers and investigators from 60 institutions located around the world. Our experiences in sample sharing over the long term have clearly shown that many researchers in the field depend on the resources made available by our lab and the other repositories in the network to carry on their basic research. Intra-lab referrals are not uncommon when the needs of an investigator cannot be fully satisfied in house, and the NGDC Core Curators File (CCF) continues to act effectively as a central clearing house for initial sample searches. We continue to transmit all new incoming WHOI geological sample station data to the NGDC and are currently fully up to date with submissions. Support from the Office of Naval Research sustains our ability to make access to the collection possible, or as is frequently the case, to fulfill sampling requirements for those investigators who may not have the opportunity to actually visit the laboratory.

It is critical to insure that new income to the collection is processed and made available in a timely manner to those scientists on the WHOI staff and from outside the Institution that contribute to the archives with samples from new cruises. Careful curation is a key factor in the successful utilization of acquired deep sea floor samples, and the standard procedures that our lab has established, refined and applied over the years assure continuity in annotation and descriptive format that a first time user, or veteran sampler encounters when coming to the facility. Many of new sample suites were added to the inventory during the grant period and this income clearly demonstrates the dynamic nature of the collection. The samples come from a broad array of sea floor sampling devices, including various WHOI coring and sea floor rock sampling systems. The new materials demand immediate attention so that important initial analyses can proceed without delay. Non-destructive whole core logging of bulk density, P-wave velocity and magnetic susceptibility are routine with our resident Multi-sensor GEOTEK core logger. This popular tool serves users both at sea and ashore and in addition to its continuous data logging mode it has been employed in a number of other innovative analytical applications.

During the grant period we also maintained our “assistance” programs that include the provision of equipment for ongoing sample acquisition expeditions, consultations on new hardware systems development and design studies, as well as staging and execution of major seagoing sampling programs. Of course principal funding for many of these programs results from other grants, but discussions and technology transfer at the start up level have been a part of our full spectrum of services for many years. Over the years our experience in staging and executing sea floor sampling operations has established the lab’s reputation as a reliable place to get information and advice on sampling techniques, as well as a source for hardware and handling equipment for actual sea going project execution.

In addition, during the grant period we devoted considerable effort towards reformatting and updating the database that is associated with new software applications for the core lab applications and via the Web at <http://www.whoi.edu/corelab/explore/index.html>.

We continue to add new incoming data as well as scan and process archived material for web-display. SEDCORE 2000 [SC2000] is utilized to search our database and download research information concerning the sea floor samples collection. Live, map-based searching, flexible annotated plotting of results, and spreadsheet displays of detailed station information and sample documentation are all available online. The results of the searches are displayed instantly in highlighted form in a global format with easy to apply pan and zoom functions, and detailed printable lists of selected station data specifications are available to the user. The importance of our consistent use of standardized procedures when describing and logging new material into the collection will be especially evident with these new ways to compare, contrast and select station data using SC2000.

Finally we completed plans for a large addition to the Mclean Laboratory for sample storage and processing. Our addition, funded internally, is scheduled to be under construction by summer 2003. Large new labs for core splitting and rock processing are included in the new construction. A second expandable walk in refrigeration unit for cores and other sample suites that require ‘cold storage’ is planned, plus a large support facility for a new 50 meter coring system under development at the lab.

IMPACT/APPLICATIONS

It is our goal to serve the needs of the global community by enabling the reuse of historically acquired samples and providing access, in a timely manner, to new additions to our growing collection. With continuing support from the Office of Naval Research we are able maintain the value that our vast collection represents and carry on our tradition of supporting all aspects of marine geological research.

Our participation in ‘popular education’ programs for students, teacher, associates of the Institution, technical writers and others continues as we regularly provide on site experiences that range from introductory tours to detailed classes on topics linked to sea floor sampling and our extensive collection.

TRANSITIONS

The sea floor samples that we curate provide the basic framework for studying the paleoenvironmental factors associated with sea-level change, climate history and other stratigraphic analyses and material to undertake plate tectonic, chemosynthetic, and a myriad of geochemical studies. The reuse of previously acquired material for new research purposes is made possible by well-organized and

accessible collections like ours and others in the community. Through the use of archived resources, it is gratifying to witness the process where older unrelated samples are combined to form new research possibilities, and it is arguably an efficient and economical method by which future research can be enhanced or independently sustained.